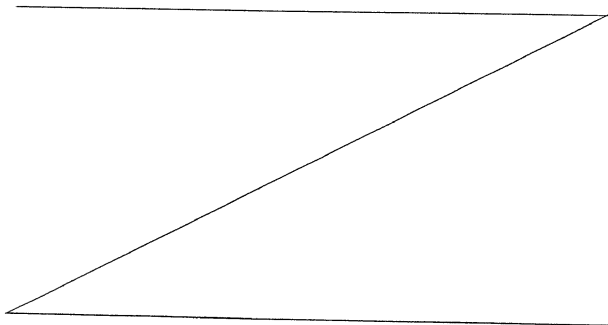


Evaluation of the Batteries

The charge/discharge cycle of the batteries of Examples 1 to 14 and Comparative Examples 1 to 2 was repeated for 10 times under an atmosphere of 20 °C. The conditions of the charge/discharge cycle were the charge termination voltage of 4.2 V, the discharge termination voltage of 3.0 V and the current of 1 hour rate. Thereafter, each battery was stored at 80 °C for 3 days and the charge/discharge cycle was carried out under the same conditions as above. The value obtained by dividing the discharge capacity of each battery after storage by the discharge capacity of the same battery before storage was shown in Tables 1 and 2 as the capacity maintenance rate by percentage. Table 1 shows the results of Examples 1 to 6, 11 to 14 and Comparative Examples 1 to 2, and Table 2 shows the results of Examples 7 to 10.



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Table 1

	Average molecular weight of side- chain	Ratio by weight of side-chain portion (wt%)	Capacity maintenance rate (%)
Ex. 1	1100	8	86
Ex. 2	1100	1	85
Ex. 3	1100	30	86
Ex. 4	310	12	86
Ex. 5	1600	8	87
Ex. 6	1100	5	90
Comparative Ex. 1	-	-	75
Comparative Ex. 2	-	-	-
Ex. 11	198	12	77
Ex. 12	3000	15	76
Ex. 13	1100	0.5	78
Ex. 14	1100	40	75

Table 2

	Capacity maintenance rate (%)
Ex. 7	90
Ex. 8	87
Ex. 9	85
Ex. 10	80

In Table 1, since the batteries of Examples of the present invention, used, as the host polymer of the gel

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electrolyte, a crosslinked copolymer having a main-chain comprising a vinylidene fluoride unit and a side-chain comprising an acrylate unit or methacrylate unit and an alkylene oxide unit, these batteries improved capacity maintenance rate after storage at high temperatures as compared with the battery of Comparative Example 1 using a copolymer of vinylidene fluoride-hexafluoropropylene as the host polymer.

These results were presumably because the problem of separation of the gel electrolyte comprising a host polymer containing a vinylidene fluoride unit at high temperatures or the problem of liberation of the liquid organic electrolyte had been solved. In other words, the copolymer of vinylidene fluoride-hexafluoropropylene used in Comparative Example 1 could form a stable gel at around room temperature but tended to separate from the liquid organic electrolyte at 80 °C. Since the liberated liquid organic electrolyte caused side reaction with the positive electrode or the negative electrode, a self-discharge of the battery proceeded. Also, since once liberated liquid organic electrolyte was not readily absorbed by the host polymer, the separator became uneven and the charge/discharge reaction became uneven as well, and thereby the utilization rate of the active material was decreased.

On the other hand, the host polymer used in the present invention could form a stable gel at high temperatures because the host polymer had a good affinity with the liquid

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